American FRUIT GROWER

JUNE 1946

Entered as second-class matter at Post Office at Cleveland, Ohio, under the Act of March 3, 1879. Additional entry at Mount Morris, Ill.

HELP YOURSELF TO BETTER CROPS

Du Pont Pest Control Products

Check this complete line for year-round protection. Write for free information.

INSECTICIDES

DEENATE* DDT
GRASSELLI* Lead Arsenate
NUREXFORM* Lead Arsenate
ALORCO** Cryolite
BLACK LEAF† "40" & "155"
Basic Lead Arsenate
Calcium Arsenate
PARAPONT*
Paris Green
Oil Sprays

FUNGICIDES

ZERLATE*
FERMATE*
COPPER-A Compound
SULFORON*
SULFORON X*
Copper Sulfate (monohydrated)
Copper Sulfate (blue vitriol)
Bordeaux Mixture
Lime Sulfur
Flotation Sulfur Paste

WEED KILLERS

2, 4-D WEED KILLER
AMMATE* Weed Killer

OTHER MATERIALS

PARMONE* Pre-Harvest Fruit Drop Inhibitor
Du Pont Spreader-Sticker
Special Dust Mixtures
KRENITE* Dinitro Spray
Phenothiazine Worm Remedy for farm livestock.
And other products for a wide variety of crops.

* Reg. Trade Mark of E. I. du Pont de Nemours & Co. (Inc.)
** Reg. Trade Mark of Aluminum Ore Company
† Reg. Trade Mark of Tobacco By-Products & Chemical Corp., Inc.

For quick kill of poison ivy and other tough weeds...

USE DU PONT AMMATE

TRADE MARK

Here's a fast-acting weed killer that's especially useful to fruit growers. One application of AMMATE usually kills poison ivy, poison oak, poison sumac, wild blackberry, chokecherry—persimmon, pecan and sassafras sprouts—brush and second-growth—as well as many weeds. It's effective because it kills *both* foliage and roots. Safe to use—non-inflammable—won't damage bark of mature trees. Can be applied with hand or power sprayer.

To kill weeds without harm to grass, use Du Pont 2,4-D WEED KILLER. Can be applied with any sprayer—works in 1 to 4 weeks. Kills weeds completely—roots and all.

• • •

FOR A SUCCESSFUL HARVEST it's not too early to order PARMONE* Fruit Drop Inhibitor. Controls pre-harvest drop of apples and pears—gives them time to develop maximum color, quality and size. Available for dust or spray application.

FOR YEAR-ROUND PROTECTION, look over the line of Du Pont Pest Control Products in the column at the left. Write for information on products that interest you. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wilmington 98, Delaware.

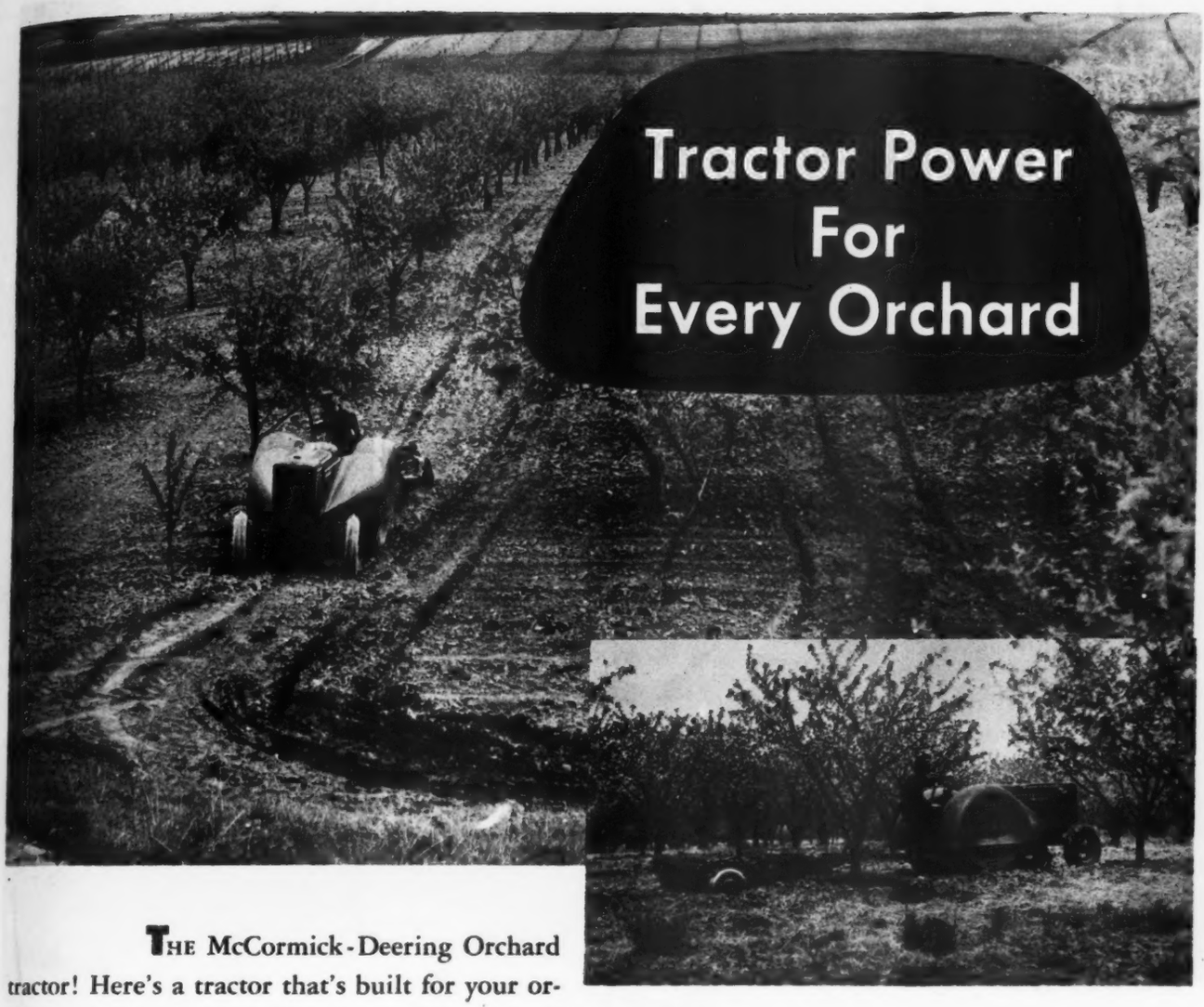
DU PONT PEST CONTROL PRODUCTS

For the harvest of better crops

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

DU PONT

REG. U.S. PAT. OFF.



THE McCormick-Deering Orchard tractor! Here's a tractor that's built for your orchard work—designed for the special kind of power you need.

From the power plant to the streamlined shielding, McCormick-Deering Orchard tractors are ideally suited to fruit growers' requirements. Powered by the same basic engine as the dependable, performance-proven Farmall H power plant, these tractors give you real operating efficiency. The five forward-speed transmission which permits road speeds up to 15 miles per hour, gives you greater flexibility of operation. The same tractor powers your tillage work and your hauling.

Besides these features, McCormick-Deering Orchard tractors give you great maneuverability. Differential steering brakes and extremely short turning-radius get you in and out of tight places between the trees. And the streamlined shielding protects low-hanging branches and fruit and young trees from damage.

Your International Harvester dealer will be glad to show you why your orchard power should be a McCormick-Deering Orchard tractor. Stop in and see him at your first chance.

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue — Chicago 1, Illinois

Product of

INTERNATIONAL HARVESTER

JUNE **1946**
VOL. 66 No. 6

CONTENTS

AMERICAN FRUIT GROWER
Published Monthly by
AMERICAN FRUIT GROWER PUBLISHING CO.
1370 Ontario St., Cleveland 13, Ohio

E. G. K. MEISTER
Publisher

Editorial Staff
J. H. GOURLEY — R. T. MEISTER (on leave)
LOUIS E. CORSI
ELDON S. BANTA — D. L. BARRETT

Advertising Manager
EDWARD L. MEISTER

BRANCH OFFICES AND REPRESENTATIVES
NEW YORK CITY, Billingsley & Fiske, 420 Lexington Ave., Room 506. Phone—Lexington 2-
CHICAGO, Peck and Billingsley, 123 W. Madison St. Phone—Central 0465

SUBSCRIPTION RATES
Domestic Except Cleveland, 3 years $1.00, 1 50c. Single copy 10c. Canada, 3 years $ 1 year 50c. Cleveland and foreign $1.00 per

Entered as second-class matter at Post O at Cleveland, Ohio, under the Act of Mar 1879. Additional entry at Mount Morris

[PRINTED IN U.S.A.]

LETTERS TO THE EDITOR

Confusing Formulae

Dear Sirs:

There are a couple of things that puzzle me about fertilizer and spray formulae and I believe you can explain them to me. What is meant when a spray of 8-8-4 is referred to? Also similar notations of fertilizers. These numbers are probably not correct, however. Do the numbers refer to weights or volumes? It is also not clear as to what the materials of these formulae are.

Sinton, Texas — C. H. Thurber

Usually mixed fertilizers are identified by numbers such as 6-8-6, the first number indicating the percentage of nitrogen, which in this case would be 6 per cent. The second number gives the percentage of phosphoric acid present (8%), and the last number indicates the percentage of potash. The percentages of fertilizers are always given in the same order; the first number being nitrogen, the second number, phosphoric acid, and the third number, potash.

Regarding spray formulae, bordeaux, which is probably referred to here, is indicated in the following manner: 4-4-50, which means four pounds of copper sulphate, four pounds of stone lime and fifty gallons of water.—Editor.

Spraying for Peach Leaf Curl

Dear Sir:

I would like to know what to do about my peach trees. They have peach leaf curl.

Cave in Rock, Ill. — Mrs. Barnerd Kaegi

Peach leaf curl is caused by a fungus which gets into the bud early in the season. This disease can be controlled by applying a spray of about twelve pounds of dry lime sulphur per hundred gallons of water when the buds are dormant or by the use of Bordeaux mixture. No amount of spraying after the leaves are out will control peach leaf curl since the disease is in the bud.—Ed.

Uncle Joe Burton

Gentlemen:

I was much interested in your article in the April issue of AMERICAN FRUIT GROWER on page 19, since I am familiar with the bringing out of the fine Turley apple.

The Turley was the product of Mr. Joseph L. Burton's untiring efforts in the propagation of new and better apples, the results of which were the Turley and Dr. Matthews. They have become very popular in this section of Indiana, as well as in other parts of the U.S.A.

As one of the leading horticulturists of his time in Indiana and an enthusiast for the Indiana State Apple Show, he conceived the idea of taking the show to the grower back in about 1912 and the proposition met the approval of the Indiana Horticultural Society. That was the year the State Apple Show was held in West Baden Hotel in the southern section of the state and at Peru in the northern section, and continued this way until the outbreak of the first World War.

For a number of years he conducted experiments in a 6-acre experimental tract near Mitchell, Indiana for the state association.

The Turley was named for his son, Turley Burton and Uncle Joe's wife whose maiden name was Turley. There are numerous members of both the Turley and Burton families in that section of Indiana.

He was familiarly known and loved by all Indiana horticulturists as Uncle Joe under which name he was a regular contributor to the *Farmers' Guide*. He was proprietor of the large Burton Orchards south of Mitchell, Indiana.

Not knowing if you were familiar with the origination of the Turley apple, I thought I would drop you a few lines. I enjoy the AMERICAN FRUIT GROWER very much.

Seymour, Indiana — Geo. W. Reider

Thanks Grower Reider for these interesting facts about Uncle Joe Burton and the Turley apple.—Ed.

Hibernal Rootstocks

Dear Editor:

I am helping a friend with his orchard, and his Delicious apple trees are checked and decaying on the Southwest side of the trunk. He purchased some Hibernal trees, and I grafted Delicious on them. They are doing fine.

How did the nursery produce these Hibernal trees? If I planted Hibernal seeds, would I have to graft Hibernal limbs on the roots, or top-work them? When should I plant the seeds?

I think your magazine is tops. If you will answer these questions it would help me a lot, as I am an amateur.

Cedar Rapids, Iowa — Geo. Kas

Hibernal and Virginia Crab are two varieties that have come into use for top-working because they are considered more hardy than commercial apple varieties. Both are varieties and are budded or grafted onto seedlings, just as are other varieties.

Hibernal seems to be preferable to Virginia Crab as the latter forms long, willowy branches which are not so well adapted to top-working.

Both of these stocks are susceptible to blight in the Central States which is a serious objection.

It is entirely possible that the trunk injury described is due to winter injury, although Hibernal is hardy in the north. If it does not mature properly then it would not resist low temperatures. Wealthy resists temperatures of 40 degrees below zero in Minnesota but is sometimes injured in Ohio and Indiana at higher temperatures than that, due to lack of maturity in seasons.

The inquiry could be due to blight cankers but probably it is cold.—Ed.

Once a Sweet Cherry—

Dear Editor:

Is it true that when sweet cherries are planted with sour varieties that the sweet variety becomes sour, too? Thank you.

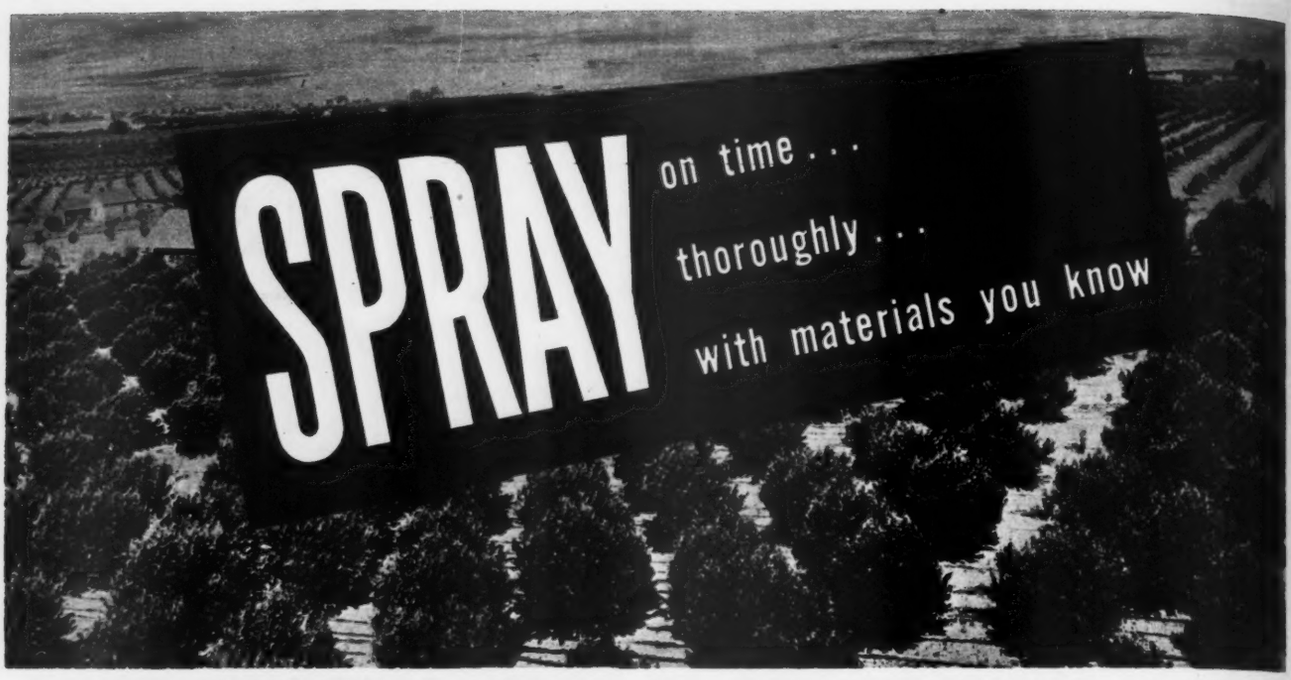
Hobart, Indiana — Frank Atrosh

No, it is not true that when sweet cherries are planted with sour cherries that they too will become sour. Once a sweet cherry, always a sweet cherry.

However, it is possible to cross a sweet cherry with a sour cherry, but of course it produces an entirely different tree, giving a Duke Cherry such as May Duke, Reine Hortense, or Late Duke.

Varieties of any fruit—or any plant, for that matter—do not change just because they are growing close to other kinds.

The change comes in the next generation from seed.—Ed.



. . . TO HARVEST MORE OF THE "MONEY" FRUIT

SPRAYS & DUSTS
REG. U.S. PAT. OFF.

More of the "money" fruit is harvested from trees that have been sprayed on time . . . thoroughly . . . with reliable materials. This is a fact every grower knows.

To be on time, the careful grower *stays ahead* of insects and diseases by keeping his eye on the weather and on the condition of his fruit and foliage, day in and day out right through the season . . . and he follows the spraying advices of his local State and Federal authorities.

To spray thoroughly, he covers all of the fruit and foliage—the entire tree, inside and out, bottom and top—whether the individual tree requires 15 gallons applied in 15 minutes or 30 gallons in 30 minutes.

And to use reliable materials, a great many of the nation's leading commercial growers depend on Orchard Brand products. These are the tested, field-proven spray materials of General Chemical Company, backed by almost half a century's experience in making insecticides and fungicides and by long association with growers in their uses. That's why you, too, can use Orchard Brand with confidence. See your Orchard Brand dealer today.

GENITOX† S50 —50% DDT Wettable Spray Powder

A superior spray powder of micro-particle fineness. It wets and disperses well in the spray tank and will not agglomerate in hard or soft waters. Genitox S50 gives a finely-divided "floc" resulting in maximum deposit on fruit and foliage and minimum run-off of the DDT insecticide . . . a highly important advantage in insect control and one not found in ordinary DDT products. *For use wherever DDT sprays are recommended or approved by State or Federal Authorities.* Controls codling moth, leaf hoppers, Japanese beetles and apple redbugs on apples; Oriental fruit moth (on peaches), as well as berry moth, leaf hoppers and rose chafer on eastern grown varieties of grapes.

"ASTRINGENT" AND STANDARD LEAD ARSENATE

Orchard Brand "Astringent" and Standard Lead Arsenates contain the original fine, flake-like particle (a development of General Chemical Research) that results in better, more uniform deposit . . . increased protection against worm entries and stings. Additional exclusive advantages are offered by the patented "Astringent." Controls codling moth, curculio and certain other insects.

MICRO-PARTICLE APPLE DRITOMIC* SULFUR

With the patented sodium thiosulfate that puts an "extra wallop" into scab sprays. Built especially for apples and pears. Apple Dritomic Sulfur is unsurpassed for particle fineness. Controls apple scab.

DRITOMIC* SULFUR

The commercial peach grower's "old reliable." Always a leader in use and performance. Controls peach brown rot and scab.

SPRAYCOP*, With Built-In Spreader Adhesive

A neutral or insoluble copper with a record of high performance in controlling copper-responding fungous diseases attacking fruits and vegetables. Controls blotch and bitter rot on apples, leaf spot on cherries; black rot, anthracnose, bitter rot and downy mildew on grapes.

*Reg. U. S. Pat. Off. †Trade Mark, General Chemical Co.

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Birmingham (Ala.) • Boston • Bridgeport (Conn.) • Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) • San Francisco • Seattle • St. Louis • Utica (N. Y.) • Wenatchee and Yakima (Wash.)
In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

ASK THE TREES!

Growth Status of Trees Shown by Sign Language

By M. A. BLAKE, New Jersey Experiment Station

IT IS the ambition and the goal of every commercial apple grower to produce fruit of any one or more of the varieties of apples he selects that will grade exceptionally high in size, color, and market and edible qualities. It is fruit that will grade a bit better than U. S. No. 1 that "tops the market" and appeals to the buyers who seek fruit that is a bit above average.

The factors which result in the development of the best grade and quality of apples have been known for many years but are still not as generally known and understood as they should be. There are some who still believe that a crop of apples of exceptional color and quality are the result of some mysterious and unknown quality of the soil. Others believe that one form of fertilizer, such as nitrogen, or some one fertilizer formula is the controlling factor.

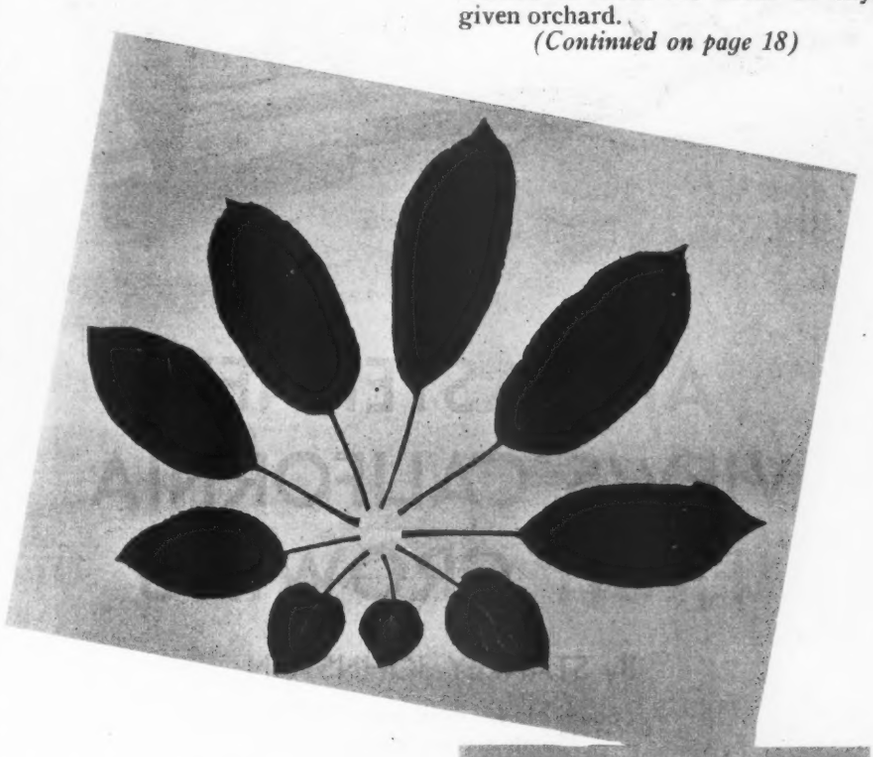
The facts are, however, that the combined effect of such basic factors as air, light, moisture, temperature, and nutrients really determines the character of any crop of apples. If any one of these is deficient or unfavorable in a given season, the ideal crop of apples will not materialize. The contention may be raised that the grower has no control over and cannot influence air, light, moisture, or temperature. How about this?

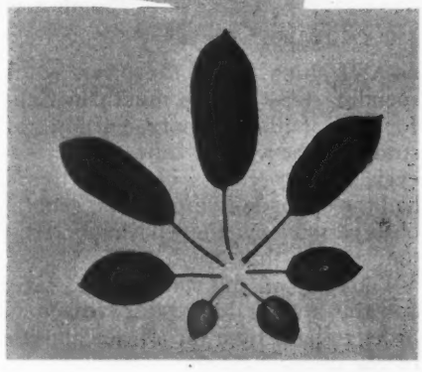
The Delicious apple will not develop fruits of the desired size, color, and quality in New Jersey if planted on a too dense soil because of a lack of sufficient aeration. If trees of the same variety are planted too close together so that little side light is available, or if the site is subject to too much shade, humidity, smoke, fog, or cloudiness, the fruit color will not be high. Lack of sufficient moisture means small apples and a dull "finish." Too much moisture means limited crops of fruit of inferior texture, color, and flavor. When selecting a site for an orchard the grower has an opportunity to choose a location with favorable moisture conditions. The amount of moisture available to the trees can also be influenced by distance of planting of the trees and by soil improvement and management practices.

Too high temperatures can alone result in apples of poor color, texture, and quality. If the daily mean temperatures are as high as 70° F. during the last two to three weeks of the ripening season of McIntosh, the fruit will be lacking in red color, firmness, and keeping qualities. No matter what fertilization practice is followed it will not offset a too warm location. The temperature of the soil can be modified at least five degrees by such a practice as mulching.

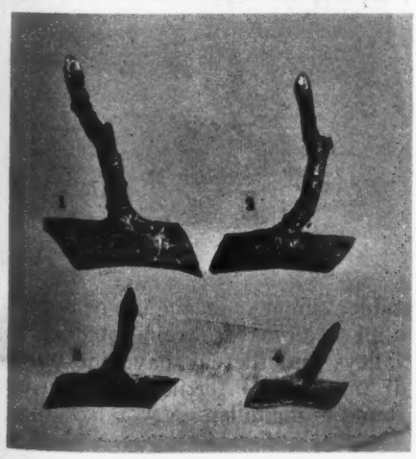
Every plant authority will agree that all plants, including apple trees, require all of the common nutrients including calcium, nitrogen, phosphorus, potash, and the minor elements. The difference of opinion arises as to how much the qualities available in the soil must be supplemented to meet the needs of any given orchard.

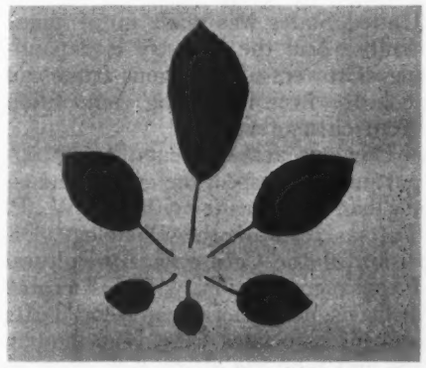
(Continued on page 18)





Four classes of dormant spur buds of Delicious. No. 1—0.22 inch in diameter and larger; No. 2—0.19 to 0.21 inch in diameter; No. 3—0.16 to 0.18 inch in diameter; and No. 4—less than 0.16 inch.





Top—Leaves from a Class 1 Delicious spur of ideal growth status. Center—Leaves from a Class 3 Delicious spur. Below—Leaves from a Class 4 Delicious spur.

Left—Discing irrigation ditches in an apricot orchard. California holds a commanding position in the apricot industry.

Below—Operating a drag in a Rutherford, Calif., vineyard. The grape industry is the state's second largest—only oil exceeds it in revenue.

AN EASTERNER VIEWS CALIFORNIA FRUIT GROWING

By STANLEY JOHNSTON

South Haven Experiment Station
South Haven, Michigan

LAST June I had the privilege of spending most of the month in California for the primary purpose of studying the apricot industry. However, in the process of doing this I had the opportunity of making general observations on the enormous fruit industry of that great state.

I arrived in the state a little early for the apricot harvesting season in order to have time for a brief glimpse of the citrus industry. The citrus industry has grown steadily until last year about 48 per cent of the entire tonnage of fruit produced in the United States was made up of citrus fruits. And the industry is expanding. Growers of deciduous fruits can look for ever increasing competition from citrus fruits.

Previous arrangements for an opportunity to inspect the apricot industry had been made with Dr. W. P. Tufts, Head of the Pomology Division of the California Agricultural Experiment Station, which is located at Davis, near Sacramento. Dr. Tufts and his associates were very kind to me and took me along with them in their travels throughout many of the fruit growing regions of the state.

The first few days were spent at Davis and at nearby Winters examining the Station orchards. Most of the time was devoted to the extensive collection of apricots at the Wolfskill Ranch, a portion of which was given to the California Experiment Station a few years ago. Probably the largest collection of apricot varieties in the world is growing on this farm, and an extensive apricot breeding program is under way here in cooperation with the United States Department of Agriculture.

The apricots grown in the Winters area are the earliest maturing in the state, despite the fact that the area is several hundred miles north of the southern boundary. It seemed strange to one used to a steady progression in lateness of season associated with increased distance northward to find the almost crazy-quilt pattern of season of maturity found in the various valleys of California.

The visitor from east of the Rockies is at once impressed with the fact that the orchards are growing in the valleys instead of on the hills. In the Middle West and East orchards are located on elevations as much as possible as a protection against frost damage. Because of California's milder climate, and the use of orchard heaters, orchards are located in the valleys and thereby have the benefit of much more fertile soils than are found in the hills.

Below—Orchard heating is essential for success in the citrus industry, with few exceptions.

(Continued on page 20)

canned in 1946.

Citrus fruit in Puerto Rico is the result of accident and an act of God. The orange trees were planted to furnish shade for coffee grown in the interior. The fruit produced was so delicious that a large local trade sprung up. Estimates say that upwards of a million crates of oranges a year are eaten by Puerto Ricans. The fruit has such a thin skin that shipping is impossible, thus preventing export in any marketable

Left—Harvesting pineapple on the Palo Blanco farm.

Below—Manager John Raymer surveys a growing pineapple field on Palo Blanco.

PUERTO RICO-

LAND OF PINEAPPLES
Where Top-Quality Citrus Fruits Grow Wild

By MEADOR WRIGHT

THE fruit growing industry in Puerto Rico is a mixture of old-fashioned and modern methods. Most of the work is done by hand labor, but some machinery has been introduced. There is a general lack of appreciation for machinery by the workers, and the growers. The workers can't understand the machines, and the growers find hand labor so cheap that no real incentive exists for using machinery.

The industry divides itself into two classes—citrus growers, and pineapple growers. The citrus fruits, oranges and grapefruit, are for local consumption almost exclusively, while the pineapple trade is exported in large quantities to the United States. In 1941, the last year before the war stopped almost all shipping,

Above — Workmen setting slips in a field. A right handed and a left handed man work together. Workmen in foreground punch holes in paper, as others follow and set slips.

Above—Dr. N. F. Childers (left), and Dr. Kenneth Bartlett (right), examine a better variety of avocado—the Panchoy—at the Federal Experiment Station.

Puerto Rico exported 425,000 crates of fresh pineapple to the United States, compared to only 97,000 from Hawaii.

Canning of pineapple in Puerto Rico was very slight in the pre-war years. The total canning of the fruit probably would not have supplied one chain of super markets in any large American city for one year.

However, the United States stepped in with a priority on tin to the Puerto Rican growers during the war, and bought all of the crop which they canned. This stimulus increased planting, and estimates now say that 600,000 crates will be amount.

Oranges sell in the streets for a penny apiece, and for 60 to 75 cents a hundred in markets. The size of the fruit is the same as the oranges which sell in the New York area for 45 cents a dozen!

It seems the destiny of Puerto Rico not to grow grapefruit commercially. In the twenties a very promising crop was planted, only to be destroyed by the severe hurricane of 1928. Efforts were made to replant the groves, but another hurricane in 1932 again ruined the trees.

At this time, Texas grapefruit

(Continued on page 23)

Photo by J. W. McManigal

NATIONWIDE FRUITS

GRAPES

Spraying Grapes With DDT

Inconclusive, but promising, results were obtained using DDT in the spraying of grapes last year by the United States Department of Agriculture in Ohio vineyards. Ohio state investigators cooperated in the experiments.

No recommendations can yet be made, but further tests are being made on small areas.

Three formulations were used, and all three showed equal success. None showed any noticeable injury to the vines. Care was taken not to apply the sprays very late in the season, to avoid any residue on the fruit. One pre-bloom and three post-bloom applications were made. The last application—combined with lead arsenate—was made July 20th.

Conclusions reached so far indicate that DDT seems most promising in the control of the rose chafer, grape rootworm beetle and the first brood of the grape berry moth. To get excellent control of the second brood of the moth, later applications are required—but excessive spray residue is very likely with the later sprays.

The three formulations used were a commercial powder containing 25 percent DDT, dispersable in water; a non-commercial powder of 50 percent strength; and a home-made emulsion of technical DDT containing benzine.

Extension workers in Tulare county, California, were successful in treating cut-worms on seedless grapes with oil emulsions of DDT. Injury from cut-worms can be checked by treating a strip around the base of the vines and stakes with DDT spray material.

A 2.4 percent DDT in light oil solution was used for the control of leafhoppers, and a 4.5 percent DDT in oil—made by combining additional DDT with standard oil.

Five gallons is required to treat an acre of vines. Care must be used to prevent DDT in oil from being absorbed by the pores of the skin.

PEACHES

Control of Late Fruit Drop

A type of fruit dropping which occurs in wet years on the Elberta peach and some of its sports after the normal June drop has been reported by growers and scientists in various parts of the country.

Professor C. L. Burkholder of Purdue University has observed this condition on Gage as well as Elberta peaches in Indiana, and reports that it occurred after the pits had begun to harden, and that Elberta fruits there averaged 1¼ inches in diameter.

Many southern Indiana orchards which had been thinned to a normal crop, lost thousands of bushels of Elbertas in 1944 and 1945, both wet years.

A Henderson, Kentucky, grower—Frank Street—has the most promising lead toward control of this late drop, Professor Burkholder says.

In 1944, Mr. Street had a normal Elberta crop after the late drop because his trees had not been thinned.

Trees that had been blossom-thinned had a much lower load at harvest time. Both lots had received one pound of ammonium nitrate per tree in early spring, as well as having had a winter cover crop and fertilizer the previous fall.

In 1945—another wet year—Mr. Street decided to do something about

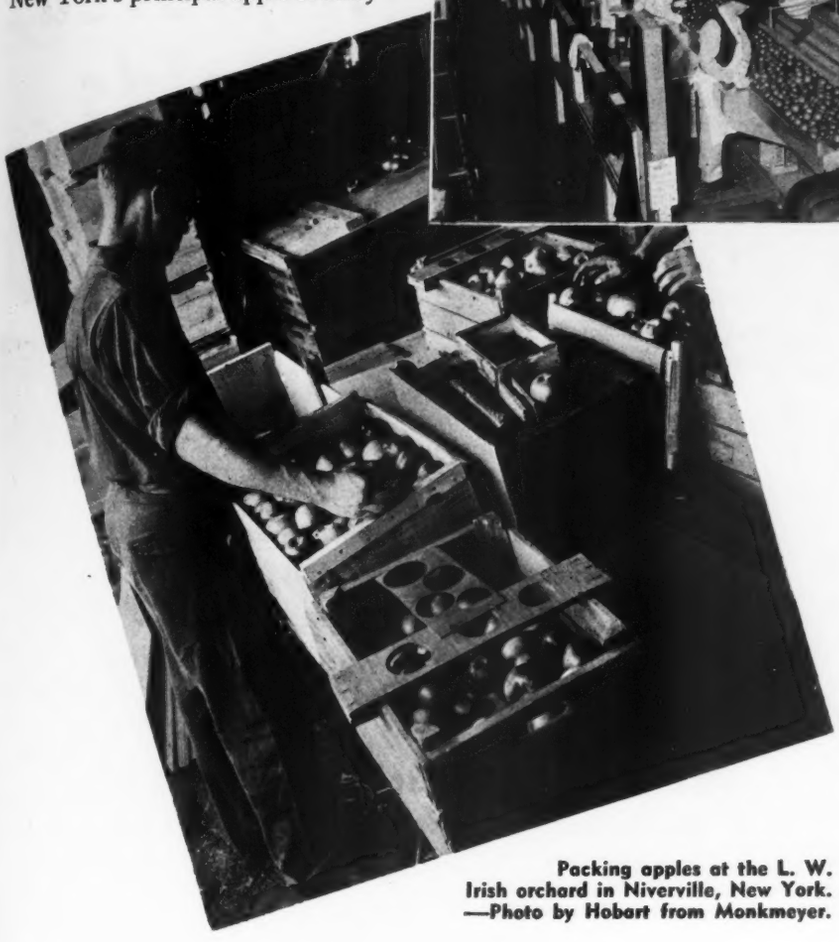
dropping. In his mature Elberta orchard, he applied another pound of ammonium nitrate per tree every time he got an additional three inches of rain. This was in addition to the fall and early spring fertilizer.

His trees had a full crop in 1945.

APPLES

Color Movie of Apple Industry

The complete story of the apple industry has been told in a sound movie called "Appleland", filmed in New York's principal apple country—the tier of counties south of Lake Ontario and the Hudson River valley.



Packing apples at the L. W. Irish orchard in Niverville, New York. —Photo by Hobart from Monkmeyer.

The movie—produced in full natural color—is designed for nationwide showing. It is available for general distribution, according to the Duffy-Mott Company, who sponsored the movie.

Stress is placed on the high development which the science of apple growing has reached since it was introduced to America by settlers from Europe.

Latest scientific methods are shown and explained in the planting, grafting, pruning, spraying, nitrating, mulching, dusting, pollination and nursery culture of the apple.

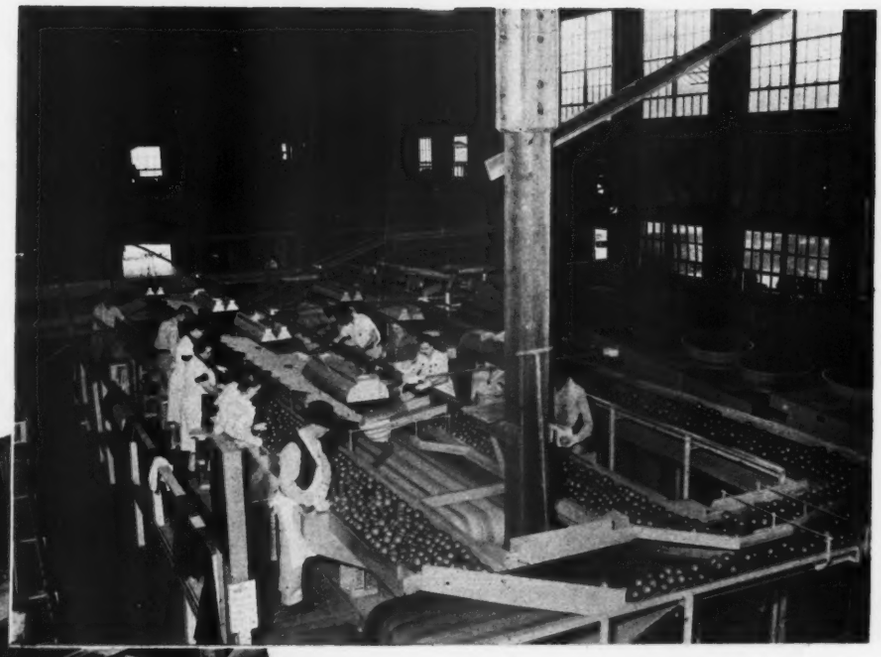
Following scenes of harvesting and dusting, the movie shifts to a New York processing plant showing how the flavor of orchard-ripened fruit is preserved in the making of apple juice, apple cider, apple sauce and apple jellies.

The operation of the Duffy-Mott laboratory is pictured, where analyses are continually made of all products during manufacture, and research is carried on in new products and new methods.

CITRUS

Dehydrated Orange Juice

Utilizing techniques developed during the war, a Florida company will soon market a dehydrated orange juice powder and a frozen orange juice concentrate.



Grading oranges in a Florida packing house. . . U. S. D. A. photo by Forsythe.

The million dollar plant now being completed in Plymouth, Florida, by the Vacuum Foods Corporation will sell to the retail trade under the trade name of "Snow Crop", and to the institutional market under the name of "Minute Maid."

It is claimed that both of the new products retain the full flavor and vitamin content of fresh oranges. The Plymouth plant will use a completely new low-temperature process perfected by the National Research Corporation.

The plant is capable of handling 20,000 gallons of fresh orange juice daily, and the capacity can be expanded to 40,000 gallons daily.

Vacuum Foods Corporation is the new name for Florida Foods, Inc. of Boston, Mass., and Plymouth, Fla., formed last year to engage in large scale production of dehydrated citrus fruits for the commercial market.

BERRIES

Spray Controls Disease

Correct timing of the spray is the secret of successful disease control of currants and gooseberries, say the plant disease specialists of the New York State Experiment Station at Geneva.

Currants are usually free from disease that causes serious loss—except that fruit rot may be troublesome in wet years.

Leaf spot diseases that defoliate the bushes in August and September may prove serious, however, by weakening the plants so that fruit buds do not develop normally. After a few years

(Continued on page 26)

CONSUMER SIZE PACKAGES INCREASE FRUIT SALES

New Bagging Machine Promises Undamaged Fruit

By EARL R. FRENCH

MARKETING methods for fruit may change materially in the next few years, as the result of experiments in consumer size packaging now being conducted in Columbus, Ohio.

Limes and oranges in ready-to-take-home packages have found constantly increasing consumer acceptance in recent years and tests are now being conducted in scattered parts of the country to study the feasibility of offering apples and peaches to the public in the same fashion.

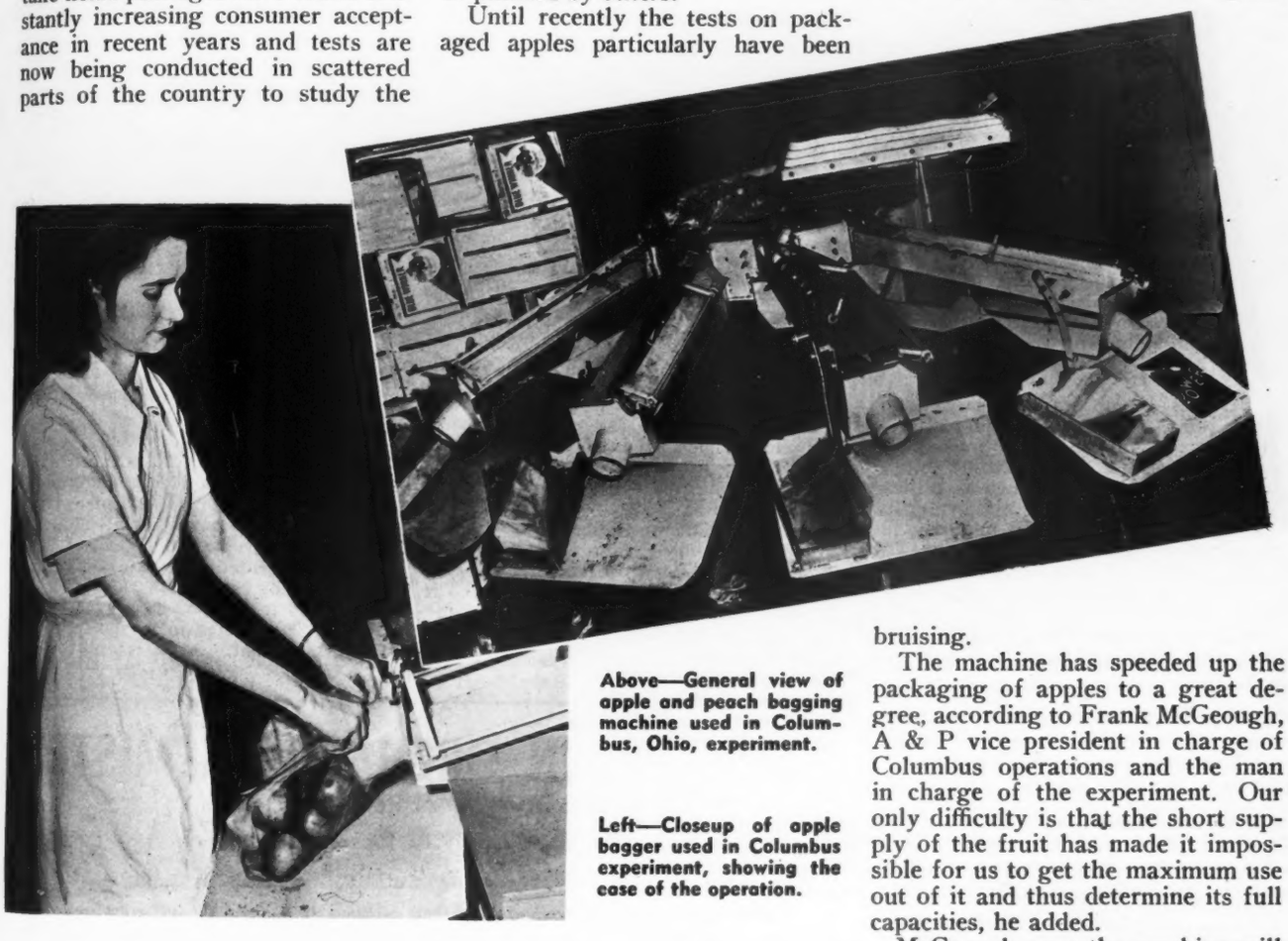
One of the better known attempts along this line is the Columbus Experiment now in its third year in the capital city of Ohio. All fresh fruits sold in the 10 A & P Super Markets used in the experiment are Cellophane-wrapped in consumer size packages and sold from a self-service open type refrigerator case.

A marked reduction in store waste and spoilage—one of the primary objectives of the experiment—has been observed under this method of merchandising with enthusiastic consumer acceptance in terms of increased sales. And the almost unanimous reaction from the consumer has been an expression of delight that the fruit had not been picked or pinched by others.

Until recently the tests on packaged apples particularly have been limping along because of the great amount of hand labor involved. But now an apple and peach bagging machine, described by its makers as "the only one of its kind in existence" may change all of this. The bagger, brain child of R. S. Grant of the sales engineering department of Food Machinery Corp., Dunedin, Fla., was custom built for Columbus.

The machine, which Grant says will package the ripest peaches without bruising, was made by hand. Four girls can bag a bushel of apples a minute, a result that is expected to be even more impressive when some of the changes are made to speed up the operation. It operates in this fashion:

Bulk apples are placed in the large revolving drum on top of the machine and flow into four long, funnel-like arms. A "stop" on each arm can be adjusted up or down to regulate the number of apples per package. The operator tilts the arm with a foot pedal, releasing the stop and allowing the apples to flow into the Cellophane bag. A second girl weighs and staples the bag. The label containing the weight and price is also stapled on. The same operation is used for peaches, Grant says, with the rubber covering on the sides of the drum and the felt on the arms providing protection against bruising.



Above—General view of apple and peach bagging machine used in Columbus, Ohio, experiment.

Left—Closeup of apple bagger used in Columbus experiment, showing the ease of the operation.

The machine has speeded up the packaging of apples to a great degree, according to Frank McGeough, A & P vice president in charge of Columbus operations and the man in charge of the experiment. Our only difficulty is that the short supply of the fruit has made it impossible for us to get the maximum use out of it and thus determine its full capacities, he added.

McGeough says the machine will be tried out with peaches this summer but he expects an acceleration in the consumer packaging of peaches in the packing houses at the shipping point. Dr. Charles W. Hauck, professor of rural economics at Ohio State University, who is working on the experiment, expects that the program of farm packaging of peaches, carried on last year in both South Carolina and later in the season with Ohio fruit, will be greatly expanded this year.

"We know that if a practical

(Continued on page 27)

State NEWS

CONNECTICUT—The unseasonably warm weather during early March advanced the fruit bud development about one month ahead of normal but cool weather followed so that fruit buds as of May 1 were about two weeks ahead of normal.

Bloom prospects on apples, pears and peaches are especially good. Frost injury to fruit buds has been serious in individual orchards, but for the State as a whole, probably not more than a 5 percent loss before May 1. Peach trees were in full bloom on April 28 and it is likely that apples will be in full bloom by May 5.

Connecticut fruit growers have done more pruning on fruit trees during the past winter than they have in any one season during the war period.

Orchards are being well fertilized and well sprayed. Barring unfavorable weather conditions during early May, crop prospects for Connecticut should be good. —*H. A. Rollins, Head of Plant Industries, University of Connecticut, Storrs.*

IDAHO—The first post war cherry festival will be held in Emmett this year on June 27th. Packing and shipping of cherries is expected to be in full swing by the time of the festival.

ILLINOIS—Apple and peach prospects in west central Illinois are as good and probably better than last year. Some of the earlier varieties don't seem to be quite as heavy but later varieties such as Willows and Bens are considerably heavier than last year. Freeze damage is limited to low areas and we hope we get by the other ten days without any more freeze damage.

Scab infection held to a minimum and with the cool weather codling moth of course is not a problem yet.—*C. C. Mast, Secretary, Illinois State Horticultural Society, Quincy.*

KENTUCKY—Kentucky has been quite lucky, so far, in both the apple and peach crop, and in spite of critical temperatures on several nights in April, we still have a good prospect for apples and peaches.

Our strawberry crop was severely injured in parts of our commercial areas, but as a whole we still expect to market a good crop of berries. Shipments started unusually early this year.

Some orchards that were practically defoliated by apple scab during May and early June of last year failed to bloom this year, or where they did bloom, the trees that had been so weakened from the loss of leaves received very little or no set of fruit. Fortunately, however, such examples as this are the exception rather than the rule.

I have also inspected several peach orchards that carried almost two crops last year, and in some cases nitrogen fertilizer was not available, with the result that this year's peach crop is very light in these particular orchards. It was just another year's experience showing that nitrogen is not only desirable but is essential on the average peach orchard in Kentucky.—*W. W. Magill, Field Agent in Horticulture, University of Kentucky, Lexington.*

MARYLAND—There has been some replanting of old peach acreage in Maryland, as replacement, and practically all of the trees on hilly sites are being set on contour.

The new field laboratory at Hancock has proved its value in having men available for advisory work in the fruit section. Several research and demonstration plots of orchard cover crops in various combinations have been laid out, and before long it is hoped that some efficient cover crops may be developed for the shale soils. The insect control research work is also being built up, with special emphasis on curculio and codling moth control as related to use of the various new insecticides, and even some of the old ones in new combinations.

The June drop will give us the final estimate of our fruit crop, but in spite of freezes and frosts, it is expected that most orchardists will have enough fruit left to worry about labor in harvesting the crop. —*A. F. Vierheller, Extension Horticulturist, University of Maryland, College Park.*

MASSACHUSETTS—A national co-operative of cranberry growers is looking for the solution to its labor shortage problem in a new mechanical picker which operates on the principle of a vacuum cleaner, and picks berries twice as fast as a field hand.

In tests conducted in Washington State last year the machine harvested 250 pounds per hour, compared with 100 pounds picked by average field hands.

A special hose was designed for the machine by the United States Rubber Co. The hose pulls the berries off the vines and conveys them to a rubber-lined container. The suction cleaning does not disturb the buds, as hand picking does, thus increasing the yield of plants.

MICHIGAN—Apple crop came through the frost in good shape. Heavy damage reported in sweet and sour cherry crops, as well as grapes, peaches, plums and pears. Cherry crop was hit heaviest, being caught with buds in most susceptible stage.

NEW YORK—Thirty-five to forty percent of bloom gone in five Hudson Valley fruit counties. Western part of state has enough buds left for a moderate crop. Damage is spotty, depending on altitude, varying from zero to over 90 percent.

OHIO—Mahoning valley crop thinned severely by frost. Orchardists predict little of some varieties of apples, peaches, cherries and pears. Many crops completely ruined.

SOUTH CAROLINA—Peach crop is expected to reach 1945 levels. No damage was suffered from recent low temperatures. Crop expected to move in the middle of July.

VIRGINIA—Despite heavy damage to blossoms by frost, a fair crop is expected next fall. Stayman, Black Twig, and Delicious apples hit hardest—some plantings report 80 per cent damage.

WEST VIRGINIA—An apple bud containing 34 blossoms was taken to the offices of the Winchester Evening Star by H. Delmar Robinson, Winchester orchardist. The usual number of blossoms on a bud is from five to nine.

The fruit crop of the state was damaged by the recent frost, with as much as one quarter of an inch of ice in some places. Damage is expected to be spotty, ranging up to 50 percent.

LESSONS IN ORCHARD CHEMISTRY

By E. D. WITMAN, Research Associate
Ohio State University Research Foundation

LIME SULFURS

Lime sulfur is a *compound* of sulfur and calcium. It is made by boiling a water suspension of lime with sulfur. When proper proportions of these chemicals are used, this process yields a reddish brown solution known as liquid lime sulfur. The compounds formed are called calcium polysulfides and they are responsible for the fungicidal action. The polysulfides are indefinite chemical compounds and are easily changed by mild physical and chemical treatments. Calcium pentasulfide, CaS_5, is thought to most closely describe the active component of commercial liquid lime sulfur.

The specific gravity (or degrees Baumé) are taken as a measure of the polysulfide content—the higher the specific gravity the more concentrated the product.

Dry lime sulfur is manufactured from liquid lime sulfur, usually by adding a little sugar and evaporating the water at low temperature (under vacuum). During such a process slight chemical changes of an unknown character occur so that a solution of dry lime sulfur in water is not identical with the original liquid lime sulfur.

Dry lime sulfur may show slightly less fungicidal action than liquid lime sulfur, but on the other hand it is less likely to bring on plant injury.

When liquid lime sulfur solution, or a solution of dry lime sulfur in water, is exposed to the atmosphere in a thin film it quickly decomposes, depositing elemental sulfur in a very finely divided state and forms various soluble calcium salts. Water, carbon dioxide, and oxygen all figure in this decomposition. The deposit of elemental sulfur has excellent sticking ability and is very active fungicidally.

with STOP-DROP

CROP and *Profit* INSURANCE!

Windfalls mean waste. Waste of profits. Waste of apples in a short crop year. Waste in the face of drastic food shortages.

WASTE that no fruit grower needs to fear if he sprays with S-W STOP-DROP. Its use insures a full crop of picked apples and full profits in your pocket.

You can practically eliminate premature dropping of Transparent, Duchess, Wealthy, McIntosh, Jonathan, Golden Delicious, Red Delicious, Stayman and Winesap apples; also Bartlett Pears, if you spray with S-W STOP-DROP.

If you face a shortage of help this year, do as other foresighted growers are doing and use S-W STOP-DROP to extend your picking season.

Harvest all your crop—and all your profits—with S-W STOP-DROP—the largest selling and most successfully used synthetic plant hormone spray.

S-W STOP-DROP is available in dust or liquid form. Order your supply now for crop insurance.

SHERWIN-WILLIAMS SPRAY MATERIALS

INSECTICIDE DIVISION

101 Prospect Ave., N. W. • Cleveland, Ohio

GROWTH STATUS OF TREES SHOWN BY SIGN-LANGUAGE

(Continued from page 9)

Trees Must Develop Carbohydrates

Trees must have favorable amounts of air, light, heat, moisture, and nutrients in order to develop thick, leathery leaves to manufacture starches and sugars or carbohydrates. Apple growers are beginning to realize more and more that apple trees cannot produce good apples without leaves. Serious spray injuries to leaves have been a costly teacher.

Trees cannot grow without the carbohydrates which they themselves manufacture. Young apple trees may be vigorous and healthy but for a number of years commonly produce no fruit because the carbohydrates are utilized largely for vegetative extension of branches and roots and for general maintenance. It is an old saying that to obtain fruit, one must have a proper balance between vegetative growth and fruit production. In other words, the tree must be vigorous but unless there is a reserve of carbohydrates in the tree over that used for vegetative growth, there will not be any fruit buds formed. It requires more carbohydrates to support the setting of fruit than for the formation of fruit buds and even more to develop a crop of fruit.

The Trees Will Tell You

A tree may actually be unfruitful if it is undervegetative or lacking in vigor, and may be equally unfruitful if too overvegetative. Even if such extremes do not prevail trees may bear fairly well but the fruit lacks size or color because of a certain degree of an under or overvegetative condition. How is a grower to know when his trees are making a favorable amount of growth and of the right composition or quality?

The best source of information is the tree itself. The growth condition or status of every tree is the result of the combined effect of all the factors which influence growth. The tree indicates what has been and is taking place within the plant by means of its leaves, buds, flowers, and fruits. If one can but read these signs he can gain an intimate knowledge of the general growth status of a tree.

Some Delicious Signs

The Delicious apple was observed to be one of the most sensitive to growth factors of any variety grown in New Jersey and a special study was made of its leaf and bud character signs. It was learned that the size of the leaves upon a spur was a dependable measure of its vigor while the form of the leaves was a good indicator of its composition.

Four classes of spurs based on leaf size were set up as summer standards for New Jersey conditions in 1934. A winter standard was correlated with the summer standard on the basis of bud size. Given favorable conditions, No. 1 and 2 spurs in summer will develop into No. 1 and 2 dormant season spurs. A large percentage of these will bloom the following season, set, and develop fruits. A No. 3 spur in summer will generally become a No. 3 dormant season spur. Some of these will bloom and set fruit under New Jersey conditions but most of the fruits will drop by midsummer. A few No. 4 spurs may bloom but will seldom set any fruit. Thus by reading the spur signs which the trees themselves provide, fairly accurate "fortune telling" is possible months in advance of a crop season.

Class 1, 3 and 4 summer spurs are illustrated on page 9, together with the dormant season spur standard for New Jersey. It is quite possible that some modification of these standards may be necessary for other regions.

Tips of Branches Give Sign

The length and diameter of the annual growth at the tips of branches is also a valuable supplement to the spur leaf and bud signs of tree composition. This, however, would require too much space for discussion here.

Apple trees indicate by the character sign language whether or not they have experienced deficiencies of moisture or of the various nutrients. It was only possible in this article to give an example of spur indicators of growth status or fruitfulness and vigor. The object was to emphasize the opportunities and advantages to be gained from a study of the character sign language offered by apple trees.

HISTORY OF HORTICULTURE

CHARLES DOWNING PRAISED SOUTHERN APPLES

By R. L. McMUNN
University of Illinois

RECENTLY when looking through an old volume of A. J. Downing's "Fruits and Fruit Trees of America," I found a very brief note in Charles Downing's handwriting with his signature affixed. This penned note reads: "The richest and highest flavored apples I have ever ate came from Georgia and the table lands of the Cumberland mountains of Tennessee. Charles Downing." The note apparently was written on a page of a small notebook, torn out and the upper part of the page torn off. It may have been a note for his files although this is nothing more than a guess.

Charles Downing was born July 9, 1802, at Newburg, New York. At twenty he started in the nursery business and continued in this business until about 1850. From 1834 to 1839 his younger brother A(ndrew) J(ackson) was a partner. After the untimely death of his brother, A. J., on the steamboat, Henry Clay, plying the Hudson, Charles took over the job of publishing, and keeping up-to-date the book, "Fruits and Fruit Trees of America," which his brother had projected. Charles then devoted the remainder of his life to studying fruit varieties and revising this monumental work on varieties upon which he soon became the leading authority. At one time his orchard contained nearly eighteen hundred apple varieties, a thousand pear varieties and large numbers of varieties of other kinds of fruits. It is said that he never spoke in public. Many of the articles he wrote are signed "C. D." With the passing of Charles Downing on January 15, 1885, the world lost one of its most distinguished systematic pomologists.

Know-How on Home Freezing

A valuable booklet on home freezing is offered free by the U. S. Dept. of Agriculture. It includes all the latest information on the subject. Write the Office of Information, U. S. Dept. of Agriculture, Washington 25, D.C.

CALIFORNIA FRUIT

(Continued from page 10)

The soil in most of the California fruit valleys is of great depth and fertility. I was told that the topsoil in the Station orchards at the Wolfskill Ranch, near Winters, was more than 25 feet in depth! Quite a contrast to a top soil depth of six to ten inches in many orchard areas. This great reservoir of soil wealth will be disturbed very little by erosion because of the flatness of the valleys and lack of rain during the growing season.

The rainy season in California extends from December until early spring with considerably more rain falling along the coastal region than in the interior valleys. No rain is expected during the growing season and accordingly irrigation is provided. Orchard land is carefully graded before the trees are planted. Contour lines are marked out in the orchards to provide for the even flow and distribution of the water. The whole process looks complicated and expensive to the uninitiated, but the system has the very great advantage of applying water when needed and in the right amount, although I was told that serious damage to the trees and soil was occasionally done by over-irrigation.

Orchard Heating Is Essential

Orchard heating is absolutely essential for success in the citrus industry, with few exceptions. In deciduous fruit growing it is used in some orchards and localities and not in others, depending upon the severity and frequency of frosts in the particular area. Growers of deciduous fruits with whom I visited were divided in their opinions as to whether or not orchard heating was profitable over the entire life of the orchard. One successful grower said that he had used heaters as insurance in the early years of his orchard development when he had every dollar he owned or could borrow invested in the enterprise and a single crop loss would have ruined him financially. As the orchard became older and he was in a sounder financial position he greatly reduced his use of orchard heating. So it is apparently a problem that must be solved on an individual basis.

Winter injury to fruit trees which is frequently so destructive in orchard areas east of the Rockies is of minor importance in the fruit growing regions of California. I was shown an orchard of apricots near Winters that had been top-grafted on the main scaffold limbs of peach trees seventy years ago and the peach trunks were perfectly sound. Such an occurrence

(Continued on page 21)

CALIFORNIA FRUIT

(Continued from page 20)

would be impossible in northern and eastern United States because of a combination of injury caused by winter cold, peach canker and the peach borer. In addition to freedom from winter injury, little damage is experienced from the peach borer and peach canker is unknown in California.

Generally less trouble is experienced with fruit insects in California than in orchard areas farther east. For instance, curculio, pear psylla and grape-berry moth are not found in California. Codling moth is present but is much more easily controlled. The oriental fruit moth arrived a year ago and strenuous efforts are being made to prevent its spread.

No Trouble With Apple Scab

California fruit growers also have the advantage of having no trouble with apple scab and little trouble with brown rot, both of which are extremely costly enemies of fruit growing in eastern areas. Virus diseases are plentiful and some of them potentially serious.

Various answers were given as to why fruit insects and certain diseases were generally less serious in California than in areas east of the Rockies. The dry summer climate of course would reduce the development of such diseases as apple scab and brown rot. Some thought that the climate was also unfavorable for the development of certain insects. Others thought that California's isolated position and its very strict quarantine laws had aided greatly in keeping out some serious insects and diseases.

Armillaria root-rot is a serious fungus disease often found in land recently cleared of the native oak. Fruit trees infected with the disease die a lingering death and the soil remains infected for many years. Pear blight is often serious and thorough control measures are followed in the principal pear producing districts.

Bartlett Pear Region

One of the most interesting sights of the trip was the Sacramento River Bartlett pear region, the greatest Bartlett producing area in the world. Levees have been constructed along the banks of the river and the highways are located on top. The pear orchards extend only a short distance inland from the river, usually a quarter-mile or less. As one rides along the highway he looks down on the tops of the trees. Suitable conditions for pear growing are not found beyond this narrow strip. The trees are large, vigorous and have had great production records. The Bartlett in

(Continued on page 22)

CALIFORNIA FRUIT

(Continued from page 21)

this locality is self-fertile, no pollenizers being required. Blight is serious at times and a moderate amount of trouble is experienced with codling moth.

California produced about 38% of the nation's peach crop in 1945, including about 14% of the freestones and nearly all of the clingstone peaches in the country. The extensiveness of the peach industry of the state is amazing as well as the large size, productivity and longevity of the trees.

California has two apple producing districts, the Watsonville area south of San Francisco, which is devoted almost entirely to the Yellow Newtown variety, and the Sebastopol district north of San Francisco which concentrates on the Gravenstein variety. California is not commonly thought of as a large apple producing state but it ranked sixth in average production among the states for the years 1934-43, inclusive.

The commanding position of the state in apricot culture can be realized when it is known that the average production from 1934-43, inclusive, was 197,700 tons annually, compared with Washington, second largest producer with an average of 13,620 tons annually for the same period.

Grape Industry Second Largest

I was told that the enormous grape industry of the state, which totals about a half-million acres, is the second largest revenue producing industry in the state, oil being first. Three types of grapes are grown, those for table use, raisins and wine.

Since my return I have been asked frequently for a comparison of the fruit growing possibilities of California and the principal fruit regions of the Middle West and East. As far as climate, soil and freedom from insects and diseases are concerned, the advantages rest with California. Nearness to the largest markets of the country is the big advantage of Middle Western and Eastern fruit growers. Each have certain fruits that do better under their own climatic and soil conditions.

Because of the great distance to the large markets in the Middle West and East, California fruit growers have been impressed with the fact that only fruit of high quality that is well graded and attractively packed will stand the expense of shipment and return a fair profit. They are alert to the value of these things plus good advertising. They are very proud of California and have great faith in its future.

PUERTO RICO

(Continued from page 11)

began coming on the market in quantity, and the depression had lowered consumption. Growers felt it was not worthwhile to replant again. So the grapefruit began to grow wild—just as the oranges. And the quality is also excellent.

Pineapple growing on the island is most directly related to American markets, and of the most interest to Americans. Since it promises to become more extensive this year, a detailed study of one plantation will serve to show exactly what is involved in the business of growing pineapples.

American Plantation

An American plantation—the Palo Blanco Fruit Farm—will be the model. It is located near the town of Arecibo, and has been owned for a decade by a group of Massachusetts stockholders, and managed by John Raymer, a tall slender American who came to Puerto Rico after being discharged from World War I.

A pleasant man with a reserved but warm personality, he was the source for most of the information in this article. His problems and methods contrast vividly with those of fruit growers in this country.

To begin with, acreage is limited to 500, the maximum any corporation can own under the Puerto Rican Land Act. In order to farm even this much it is necessary to separate the arable land from the rocky knolls that take up about half of the total area of Puerto Rico. These knolls, which rise to a height of 200 feet, grow nothing but small weeds and bushes. A few goats browse on them, but the land value is practically zero. Almost pure limestone, they do supply what lime is needed for the arable land. At the Palo Alto farm these knolls are held by a separate corporation.

Of the 500 acres of land suitable for pineapple growing, 425 are actually in pineapples, with 75 acres lying fallow, or being readied for planting. Until recently it was thought that pineapple land had to lie fallow half of the time to maintain fertility.

But Mr. Raymer has found that with proper fertilization and by utilizing leaves and stalks, one crop can follow another with only a brief period of rest. Cost of fertilizer, however, is heavy. One ton of 12-6-10 or 14-6-10 is used per acre each year. This costs from $47.50 to $50.00 a ton laid down in San Juan,

(Continued on page 24)

PUERTO RICO

(Continued from page 23)

and is imported from the States. Limestone needed is ground locally.

To cultivate 425 acres 150 laborers and other workmen are employed. All of this labor is unionized. While not mandatory, the Palo Blanco farm pays the same rates as fixed by law for the sugar plantations. This ranges from $1.60 to $2.12 for an eight hour day. Operators of light trucks, tractors and other farm machinery get thirty cents an hour. Drivers of heavy trucks get forty-five cents, but are put on a piece-time basis as much as possible.

Foremen of the laborers get thirty cents an hour and ride about the farm on lean ponies.

Planting Is Expensive

Preparing the land for pineapples is a rather expensive proposition. To secure proper drainage, sub-soil is broken to a depth of eighteen inches to two feet by a heavy colter pulled by a tractor. To break up the heavy pineapple stalks, a triple tiller made by Seaman Brothers in Milwaukee is used. This machine costs about $3,000 delivered in San Juan and has its own motor. A small tractor is thus able to pull it along. Both motors use 40 gallons of gas a day. The farm uses John Deere Model "L", and 55 horsepower Caterpillar tractors.

The 10,000 slips for an acre of pineapples cost $100. Puerto Rican growers buy many of these from Cuba, but rivalry between the two islands makes Cuban growers reluctant to sell all that are needed. Traditionally, the slips are planted in two rows a little over a foot apart each way, with enough space between the double rows for an ox to pull a cultivator. Mr. Raymer now sets his plants in three rows with space for a small tractor to operate between the triple rows. Planting takes place between May and August.

Weeds Are Constant Threat

After planting there is a continual battle with grass and weeds. Nothing but a hoe has been found successful to clear the grass around the plants. Weed-killers have not been a success. Thirty to 50 men are kept busy all the time with hoes. A third of a cup of liquid carbide is poured into each plant when pineapple is approaching maturity to hasten that maturity. This takes the place of the "smoking" formerly done by movable tents. Two crops are produced from one planting. This takes nearly three years.

Mr. Raymer considers 350 crates an acre a good yield. The average for the island is not that high. Average pre-war price was around $2 a crate. Those shipped this season are selling at twice that figure, and hence are very profitable. What the eventual post-war price will be is anyone's guess. Competition with Cuba looms as one of the greatest threats.

Typical labor output per man in Puerto Rico is very low. Part of this can be made up by the increased use of machinery, but the use of machinery is limited by the lack of familiarity of Puerto Rican labor with it.

Mr. Raymer admitted upon questioning, however, that if farm labor cost five dollars a day as it does in the States, more effort would be made to mechanize all phases of pineapple growing and processing.

One phase of harvesting which Mr. Raymer tried to modernize was stoutly resisted by the men. Pineapples are picked by cheap labor, some of it women and boys, and the heavy crates are carried to the roads on the heads of Jibaros. When a large-wheeled cart was designed to haul the fruit the Puerto Ricans refused to load it.

U.S.D.A. Station in Puerto Rico

No story of Puerto Rican fruitgrowing would be complete without a few paragraphs about the U.S.D.A. Experimental Station at Mayaguez on the eastern tip of Puerto Rico. This station is run in connection with the Puerto Rican College of Agriculture and was established shortly after the Spanish American War. It is ably directed by Dr. Kenneth A. Bartlett and his assistant, Dr. Norman F. Childers.

This station is a gold mine of information on tropical agriculture. Much of their research in fruit is with mangoes and avacadoes. More than 160 different varieties of mangoes have been bred on the station. Of these, some six or eight have great commercial possibilities. The mango grows particularly well in Puerto Rico. The trees grow to huge size and are so strong that hurricanes do not cause serious damage. Dr. Childers thinks Puerto Rico should have several times as many mango trees as it has at present, and the station has huge nurseries to help supply young stock.

An interesting experiment in pineapple growing is also being conducted by a government sponsored agricultural company managed by Mr. Tom Fennell. Mr. Fennell is

(Continued on page 26)

OPPORTUNITY ADS

Only 15c a Word—CASH WITH ORDER. Count each initial and whole number as one word.
ADDRESS: AMERICAN FRUIT GROWER, 1370 Ontario Street, Cleveland 13, Ohio

BABY CHICKS

HELM'S PULLORUM CONTROLLED CHICKS. Holder Four World Records. ROP sired matings. Sexed Chicks. Free Brooding Bulletin. ILLINOIS HATCHERY, Metropolis, Illinois.

250-350 PEDIGREED SIRED BIG FLOPPY COMB Type egg-bred "AAA" English White Leghorn Pullets $15.50. Unsexed $8.50. Cockerels $2.75. Four Weeks Old "AAA" Pullets $25.50. 95% sex guaranteed. Catalog. MARTI LEGHORN FARM, Box A, Windsor, Missouri.

EDUCATIONAL

CORRESPONDENCE COURSES AND SELF-INSTRUCtion books slightly used. Sold, Rented. Exchanged. All subjects. Satisfaction guaranteed. Cash paid for used courses. Complete information and 100-page illustrated bargain catalog FREE! Write—NELSON COMPANY, Dept. 2-65, Chicago 5, Illinois.

FERTILIZERS

AMMONIUM NITRATE—32.5% NITROGEN. JUNE DElivery. 30 ton minimum cars. Suitable for side dressing corn, etc., top dressing pasture. Dealers wanted. SCHROCK FERTILIZER SERVICE, Congerville, Ill.

FOR SALE—EQUIPMENT & SUPPLIES

BEAN SPRAYER, 3 CYLINDER, HORSE DRAWN type, never used. $500.00. GEO. CHRISTENSEN, Route 2, Springfield, Illinois.

ONE MYERS 66 G.P.M. BULLDOZER PRESSURE pump equipped with 5 H.P. Electric Motor, relief valve, air control gauge, and switch, ready to connect and start pumping. Good working condition. $250.00 f.o.b. our farm. FRANK FARNSWORTH FRUIT FARM, Waterville, Ohio, Phone 3131 or 3125.

"GARD" ELECTRIC—FLY TRAPS, INSECT KILLERS, Fans, Clocks, Hot Plates, Heaters, Dept. AFG, GARDENHOUR MFG. CO., Waynesboro, Pa.

FOR SALE. WE HAVE AVAILABLE FOR PROMPT delivery equipment both used and new such as—Sprayers; hi-pressure pumps; fruit graders; gasoline power units; pumps for domestic uses; tractors and bag elevators; also fertilizers, spray and dusting chemicals. Advise us of your needs; we will promptly give you full details. THE CHAS. M. INGERSOLL CO., 19930 Detroit Rd., Rocky River, Ohio, Tel.: Edison 1010.

FOR SALE—Immediate Delivery—New Apple Graders complete with polishers 400 and 800 bushels per day. Power Dusters for row crop and Orchard. New Flexible Spray Hose. Centrifugal Pumps and motors. Power and Gravity Conveyor. Bushel Turners. Bushel Cushions and Liners, Facing Plates and Shells, Irrigation pipes and systems complete. Electric Shop welders, 250 Amp., and Air compressors. If it helps to grow or pack fruit TRY US. MICHIGAN ORCHARD SUPPLY COMPANY, South Haven, Michigan. Phone 252.

FOR SALE—3 HARDIE SPRAYERS 35 GAL. PER minute capacity. 400 gallon tanks, mounted four wheels. Pneumatic tires. Excellent condition. Selling because replaced by larger equipment. NEAL FRUIT FARM, 9800 Detroit Avenue, Cleveland, Ohio. Tel.: Woodbine 3028.

FOR SALE: CIDER PRESSES AND SUPPLIES, Apple and peach Electro Magnetic Sizers. W. G. RUNKLES MACHINERY COMPANY, 185 Oakland Street, Trenton, New Jersey.

KILL ALL WEEDS WITH 2000 DEGREE FLAME. Famous fire gun sterilizes, thaws, incinerates, disinfects. Works like blow torch, burns kerosene, mostly air. Economical, safe, sure. Free literature tells how. Write SINE EQUIPMENT, AFG 1, Quakertown, Pa.

28 INCH HYDRAULIC WINE PRESS. PRACTICALLY New. $200.00. WRITE BOX 55, Pearl, Illinois.

MALE HELP WANTED

FOREMAN AND ASSISTANT MANAGER, PREFerably agricultural college graduate who enjoys growing, grading and packing apples. 20,000 bushel apple orchard, best varieties, fine mountain climate. Man must be healthy, strong, industrious, temperate, married, not over 45. Must get good, steady work from 6 or 8 year-round hands and keep gasoline spray engines, pumps and grading machines operating steadily and efficiently. Will provide house and pay straight salary or salary and share in profits to right man. Give full particulars first letter. BOLLING HALL, Waynesville, North Carolina.

OPPORTUNITY OF LIFETIME SUPPLYING DDT AND other profitable products to farmers. No experience or capital required. Must have auto and good references. Permanent. Write or wire McNESS COMPANY, Dept. 705, Freeport, Illinois.

MISCELLANEOUS

TRE-TEX SAVES ANY TREE FROM DAMAGE BY Rabbits, Mice, Gophers, Squirrels, etc. Also Fruit tree borer and scab repellent. Applied any time of year like varnish. $1 package for 100 to 150 trees lasts 12 months. Unused portion never spoils. RESULTS GUARANTEED. Also saves time as one hour is enough to fix 100 young trees. Trade name changed in April from NO-NAW to TRE-TEX. Patent and Trademark pending. E. L. ECKERLEY, Orchardview, Box 91, Noblesville, Indiana.

ENGLISH SPARROWS EAT AND DESTROY FRUIT. Make your own trap that will catch thousands. Write for details. ROY VAIL, La Grange 24, Indiana.

NURSERY STOCK

DEPENDABLE FRUIT AND NUT TREES, SMALL fruits, Ornaments, and General Nursery Stock Combined catalogue and Planting Guide free. CUMBERLAND VALLEY NURSERIES, INC., McMinnville, Tennessee.

STRAWBERRY PLANTS — BLAKEMORE, MISSIONary at 100 for $2.00; 500 for $5.00; Postpaid. 1000 for $8.00. Everbearing at $15.00 per 1000. Boysenberry thornless at 20c each. JOHN LIGHTFOOT, Birchwood, Tenn.

IMPROVED BLUEBERRIES. DELICIOUS U.S. GOV'T Hybrids large as grapes. 2 Yr. Plants 70 cents each, $8.00 per dozen. 3 Yr. Bearing Age Plants $1.35 each. $15.50 doz. GEO. C. MORSE, Williamson, New York.

PEACH AND APPLE TREES LOW AS 20c. PEARS, plums, cherries, nuts, berries, grapevines 10c. Evergreens, shrubs, shade trees low as 25c. Catalog Free. TENNESSEE NURSERY COMPANY, Box 202, Cleveland, Tennessee.

ORCHARDS FOR SALE

50 ACRE McINTOSH ORCHARD—HIGH PRODUCER —good air drainage—good soil fertility—ample water supply available—beautifully located house—good condition with electricity, running water—large storage building—state road—more acreage of orchard available if desired. OXFORD FRUIT FARMS, William A. Greene, Oxford, Mass.

FOR SALE—GOOD 38 ACRE FRUIT FARM. MODERN house. New Packing House and Refrigerated Storage. Everything in wonderful condition. 2½ miles from Grand Rapids. JERRY SIETSEMA, R.R. 4, Grand Rapids, Michigan.

PATENTS

NATIONAL TRADE MARK COMPANY, MUNSEY Building, Washington, D. C.

PHOTO FINISHING

CENTURY DELIVERS WORK AND SERVICE THAT can't be beat. 8 exp. roll 25c with two professional enlargements FREE. CENTURY PHOTO SERVICE, La Crosse, Wisconsin.

PLANTS FOR SALE

SWEET POTATO PLANTS—NANCY HALL, PORTO Ricos. Extra sweet, big, strong, vigorous, well rooted. 200 $1.00; 500 $1.75; 1000 $2.75; 5000 $13.00. J. C. DELLINGER, Gleason, Tennessee.

CERTIFIED AND STATE INSPECTED TOMATO Plants; Rutger and Marglobe, $3.00—1,000; $2.00—500. F.O.B. Express or parcel post. Field-grown and ready for shipment. Order today. SIMS PLANT COMPANY, Pembroke, Georgia.

RABBITS

GUARANTEED GIANT CHINCHILLA RABBITS. PROlific, Profitable. Most Valuable Fur. Markets Furnished. Details Free. WILLOW BROOK FARM, R-432, Sellersville, Pa.

LIFETIME PAYING BUSINESS. LEARN COMMERcial Angora Wool Rabbit Raising, easily—quickly. Particulars Free. ANGORA INSTITUTE, Box 667B, Salem, Oregon.

RUBBER

RUBBER — YOUR RUBBER REQUIREMENTS ARE important—know where to get it when you want it. Belts—rubber bands, boots, coats, gloves, hose, spray bulbs, aprons, budding strips. Get our Price Sheet and Catalog today. BROADWAY RUBBER MANUFACTURING COMPANY, Louisville 2, Kentucky.

SONGWRITERS

SONG POEMS WANTED. FOR MUSICAL SETTING. Send poem for immediate consideration. FIVE STAR MUSIC MASTERS, 716 Beacon Building, Boston 8, Mass.

TREE BANDS

EARLY BIRD TREE BANDS CHEMICALLY TREATED. Kills the Codling Moth. Send orders early. EDWIN H. HOUSE, Saugatuck, Michigan.

BETA NAPHTHOL TREATED APPLE TREE BANDS kill codling moth! Write for literature and prices. M. A. KOELLER, Barry, Illinois.

TURKEYS

RAISE TURKEYS THE NEW WAY. WRITE FOR FREE information explaining how to make up to $3,000 in your own backyard. Address NATIONAL TURKEY INSTITUTE, Dept. 233, Columbus, Kansas.

WANTED—OLD BOOKS

WILL PAY $5,000.00 EACH FOR CERTAIN OLD books! Histories $125.00; Poems $2,500.00. We also buy Deeds, Newspapers, Autographs and letters. Catalog 10c. OHIO HISTORICAL PUBLISHING CO., 209 W. 11th Avenue AFG, Columbus, Ohio.

WELDING

MAGIC ELECTRIC WELDER, 110 Volt AC-DC; welds, brazes, solders, cuts all metals, easy to use; full directions. Complete with power unit, flame and metallic arc attachments, carbons, fluxes, rods, mask. Guaranteed One Year. Only $19.95. Used by the Navy. Splendid for farm use. MAGIC WELDER MFG. CO., 241 LS Canal St., New York, New York.

PUERTO RICO

(Continued from page 25)

assisted by Mr. Meredith Clark. The experiment concerns pineapple growing on the large island of Vieques off the western tip of Puerto Rico, where rainfall is much less than over Puerto Rico proper. Since the climate and soil approximates that of Hawaii, it is Mr. Clark's belief that the smooth Cayenne variety of pineapple—raised almost exclusively in Hawaii—can be grown here. Several hundred acres have been planted so far and there are twenty thousand acres of land on the island suitable for pineapple growing.

To conserve the limited moisture, slips are set through sheets of black paper. This paper also prevents grass from growing among the pineapple plants where it cannot be reached by machinery.

More suitable for canning, the Smooth Cayenne does not do as well in most of the West Indies as the Red Spanish, which is the variety most generally seen on the domestic market. If Mr. Clark's theory is borne out, Puerto Rico's pineapple growing potential will be increased many times.

NATIONWIDE FRUITS

(Continued from page 13)

the bushes become stunted and the yield is markedly reduced.

Currant leaves may be protected against leaf spot infection with two applications of a bordeaux spray, in seasons when rainfall is not excessive, during and just after the blooming period.

Applied three weeks after bloom, and again after the fruit has been picked, the spray contains three pounds of copper sulphate and three pounds of hydrated lime in 100 gallons of water.

In a season like 1945, better control of leaf spot was obtained in plantings which received an additional application of the bordeaux mixture immediately after bloom, for the control of Botrytis mold.

Full details on control of leaf spot on currant plants is available from the Experiment Station.

Powdery Mildew Checked

A spray is now available which will hold in check powdery mildew—the most destructive malady of gooseberries—as well as leaf spot diseases.

To control powdery mildew, the bushes must be sprayed with lime-sulphur, 1-50, immediately after bloom. Spraying after the disease appears will not give satisfactory results.

Watch for
JULY DIRECTORY *Issue*

CONSUMER PACKAGES

(Continued from page 15)

method of bringing tree-ripe peaches to market can be devised that we can greatly expand the present demand," Dr. Hauck, who represents the Ohio Agricultural Experiment Station in the experiment, comments. "We think that consumer packaging at the shipping point offers tremendous possibilities."

Special consumer packages were designed by the Ohio Boxboard Company, another cooperator in the experiment, in an effort to find a container that would materially reduce, if not eliminate, the costly bruising peaches customarily suffer in conventional containers. A start was made in this direction but shortages of material delayed the work that is expected to be carried on in expanded fashion this season.

The consumer packaging in Columbus has spurred other sections of the country to try it out and in both Oregon and Washington apple growers have announced plans to set up pilot plants. One grower association in the West has set up a fund of $10,000 to start the tests.

Maine Profits From Plan

A talk on the Columbus Experiment was the incentive that sent three Maine apple men to the middle west city to view the operation. The result of their visit was the formation of an apple marketing committee which conducted tests in several Maine stores recently to learn consumer reaction to packaged apples. The result was an overwhelming vote in favor of the packages over the bulk—cast in the form of sales of better than five to one in favor of packages.

Myron Lord, prominent grower and a member of the Maine committee, explained that his group also plans to test various methods in which the apples can be marketed. He feels there is a good possibility of a big market for apples that have been cored for baking and quick frozen, a large potential market for sliced frozen apples and apple sauce and unlimited possibility for the sale of apple juice and apple cider in handy consumer size bottles.

While the war, with its shortage of materials, and the weather has delayed many phases of the fruit packaging program, progressive growers are becoming more and more convinced that this method of merchandising their wares is one that ought to be looked into very closely in view of the consumer-package trend that is sweeping the country.

Ramblings OF A HORTICULTURIST

SILENCE and solemnity subdued the multitudes as they watched the coronation of Queen Shenandoah the XIX. She was to reign over the great Shenandoah Valley's expansive orchards; her crown was an emblem of the beauty and bounty that God had bestowed upon the Valley. Upon completion of the coronation ceremony, the throngs burst into hilarious applause and happy spirits. A new and beautiful Queen was now casting her magic charm over their Valley, and they loved every minute of it.

Secretary of Agriculture Clinton P. Anderson sat in the front row with Admiral Richard E. Byrd and other dignitaries, nervously viewing the performance. He had a right to be a bit restless because it was his daughter Nancy, who was being crowned Queen.

The Shenandoah Apple Blossom Festival made its debut to the world on May 3, 1924, in Winchester, Virginia. On that day the rich valley was bathed in gorgeous clusters of apple blossoms. But not so this year, for the blossoms had come and gone two weeks in advance; another of nature's tricks.

Invitations to the first Shenandoah Apple Blossom Festival were extended to President Coolidge and members of his cabinet, as well as other Washington dignitaries. Few, however, were able to attend, the President along with others having other engagements. But John W. Weeks, then Secretary of War, came and delivered a short, inspiring address. The Festival then was much as it is today, the crowning of the Queen, the big parade and other festivities, but it lacked the pageant that now graces the occasion. The people of Winchester and the Valley said, "We want the world to know that the best apples grow in the Shenandoah," and they put it into action with the first annual Festival in 1924.

Held on the spacious and beautiful terraces of Handley School in Winchester, the coronation ceremony was one of grace and splendor. Fleet Admiral Chester W. Nimitz placed the golden crown upon the head of Nancy Anderson, and with a brief statement enthroned her as Queen Shenandoah XIX.

Fleet Admiral Chester Nimitz crowns Miss Nancy Anderson (daughter of the Secretary of Agriculture) Queen Shenandoah XIX at the Annual Apple Blossom Festival.

All this took place under cloudy and threatening skies. The day was destined to be spoiled.

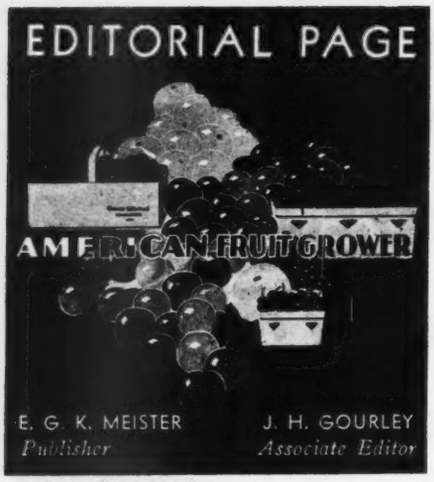
"Our Heritage" was a pageant of springtime, written by Garland R. Quarles. It had a spiritual cast to it. In the prologue 40 high school girls draped in white Grecian robes entered the outdoor theater while the chorus sang "Holy Art Thou." A reader, over the public address system, narrated the blessings of God.

Then, as an act of the ungodly, the rains descended upon the costumed children and the hopeful but disappointed audience. The pageant was through for the day, and the people sought shelter. But the following morning the entire play was presented to some 20,000 people gathered on the school grounds.

Part one exemplified the good earth. Costumed children tripped on and off the stage to indicate the change from winter to rapturous spring. In part two, the old woman-in-the-shoe with her dozens of children typified the joys of childhood. Enacted in narration and pantomime, the acts were gorgeous. The spirit of America was portrayed in part three with an old covered wagon and pioneer-dressed children crossing the stage. Then for the final number came the groups of high school girls dressed in red, white and blue, 240 in number. The band played Stars and Stripes Forever and the National Anthem, while the chorus closed the pageant by singing America The Beautiful.

Friday of the Festival was Vandergrift Day. In the afternoon, the Grand Feature Parade formed and passed the reviewing stand where General A. A. Vandergrift, Commandant, U. S. Marine Corps, was seated, along with other dignitaries. Heading the hour and a half long procession that circled through the city streets were the floats of Queen Shenandoah XIX and her court. Float after float, Army, Navy and Marine Corps divisions, Cadets and bands galore passed the reviewing stand.

That was the nineteenth annual Shenandoah Apple Blossom Festival, a truly grand celebration.



Food Alone Is Not Enough

AMERICA is making a commendable effort to stave off starvation in Europe by cutting home consumption and sending food overseas. President Truman and his aides are doing a noble job. But it is not enough.

We cannot feed Europe from our stockpiles and from our coming harvest. We can only fill a temporary need; bridge the gap for the stricken countries.

It is not enough to send food, because there is not enough food to send. Transportation facilities in Europe are too poor to distribute the food properly.

American farmers performed miracles in food production during the war. They were severely handicapped by insufficient and outmoded machinery.

But stockpiles are low, and the world's margin of safety in food is also very low. These stockpiles cannot be kept up, and Europe fed at the same time for very long.

Europe wants to grow her own food. A recent trip to Europe made by Mr. Roger M. Kyes—President of Harry Ferguson, Inc.—taught him that.

Mr. Kyes said that European agricultural experts told him almost unanimously that what Europe wants is equipment and machinery to make her land produce again. Before the war, power on European farms was derived from horses and oxen. These animals have been used to relieve the food shortage in the fight to maintain life. Farmers are now without power to pull their tools.

The key to solving the whole problem is to let Europe produce her own food, and to give her food until her harvests begin.

It is a problem that only America can help her solve. Americans must insist on a plan that is broader than mere relief. We must demand a revitalizing of European agriculture.

The American government should push the production of vital farm machinery—restrictions should be lifted, permitting manufacture to speed up; every available facility should be used every day; priority should be given to manufacturers of farm implements so that production can supply the needs of both Europe and America.

Transportation should be organized in the stricken countries to effect efficient distribution of foodstuffs. Railroad rolling stock, trucks, and fuel should all be made available and kept in good running order to expedite the supply of food in Europe.

And dollar credit should be set up in this country so that European farmers may buy the supplies, machinery and food processing equipment so badly needed.

We cannot feed Europe, we can only fill the gap until she is able to feed herself. Our most important job is to help her feed herself. We have the means to produce the needed equipment—we must make it available now so Europe can remove the ugly threat of famine from her people.

Farm Labor Prospects

AGRICULTURAL labor is still very short. The outlook for 1946 is not a bright one. Fruit growers and farmers the nation over are wondering whether they will have enough help for the 1946 harvesting season.

Michigan plans to import large numbers of Texas Mexicans and Mexican Nationals this season to work the fruit crop. A recent meeting of the Virginia Farm Labor Committee suggested that the United States raise immigration restrictions to permit farm workers from wartorn countries to come over and help raise the food that will be sent abroad to relieve the shortage in Europe. They requested that workers from the Netherlands and Scandinavian countries be particularly sought.

The U. S. Department of Agriculture has asked all users of farm labor to make full use of local sources of labor, and all sources within the state.

Arrangements are being made, according to the U. S. D. A., with the Mexican government to import workers. The Department has already completed negotiations with Bahamian, Jamaican, Honduran and other West Indian governments for 1946 importation of workers. After completion of the Mexican negotiations, the U. S. D. A. will make allocations according to States. However, state sources must be exhausted before any application can be made to the U. S. D. A. for workers.

Fruit Growing for the Oldster

OF ALL THE correspondence that comes to our office, none arouses admiration or stimulates the imagination more than that from older readers who contemplate the planting of more orchards. Not that we think that orcharding is a young man's venture or that only the young can hope to reap the rewards of their investment. But somehow it has gotten into the minds of many that it requires an unduly long time for fruit trees to reach maturity and commercial bearing. This is a fallacy that should be dispelled and the best proof is the experience of a host of "old men" who have entered the fruit business rather late in life.

We do not mean to inject sentimentality into the matter, for it is a very practical matter. Neither do we eliminate the esthetic aspects of living among fruit trees and other people with like interests.

One who plants a tree has no intention of leaving the world where it is to grow. When he plants a new block of orchard, he just has to live to see it come into bearing. That in itself keeps him young; it gives him something important to live for, it not only keeps his enterprise young and changing, but does the same for him.

One who attends fruit meetings is constantly aware of this matter. We recall attending one New York State meeting when a man who was well past eighty inquired about the newer varieties of apples and said he would plant another orchard in the spring and wanted the most modern sorts. We were taken aback at first for even his son seemed like an "older man." But we were mistaken. This man did plant the orchard and is living to see it come into full bearing. Of course!

A man of our earlier acquaintance planted an orchard after he was well past sixty and his neighbors thought him a bit "daft." But he became one of America's veteran fruit growers and contributed much to the industry as well as taking much out of it.

The only other activity that might exceed orcharding as a means of keeping one's curiosity baited up to the point where his "youth is renewed like the eagle's" is that of fruit breeding. One must engage in it to experience the excitement of seeing some new offspring brought into the world through his own efforts. The new seedling *might* be better than any we now have, but that would be a lucky break. The outcome is unpredictable. It's a good hobby for us as we grow older.

and D.D.T.

Dow DDT formulations are ready! *Specific* formulations for *specific* uses in orchard and field. Designed for use under appropriate circumstances described on each separate label.

Examples: Dow DDT-25 and Dow DDT-50 Wettable, concentrated powders for control of *codling moth*. Compatible with Bordow, *DN*-111, "Mike Sulfur" and other fungicides and insecticides. Excellent residual powers. Economical to apply.

AGRICULTURAL CHEMICAL DIVISION
THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

DOW
CHEMICALS INDISPENSABLE
TO INDUSTRY AND AGRICULTURE